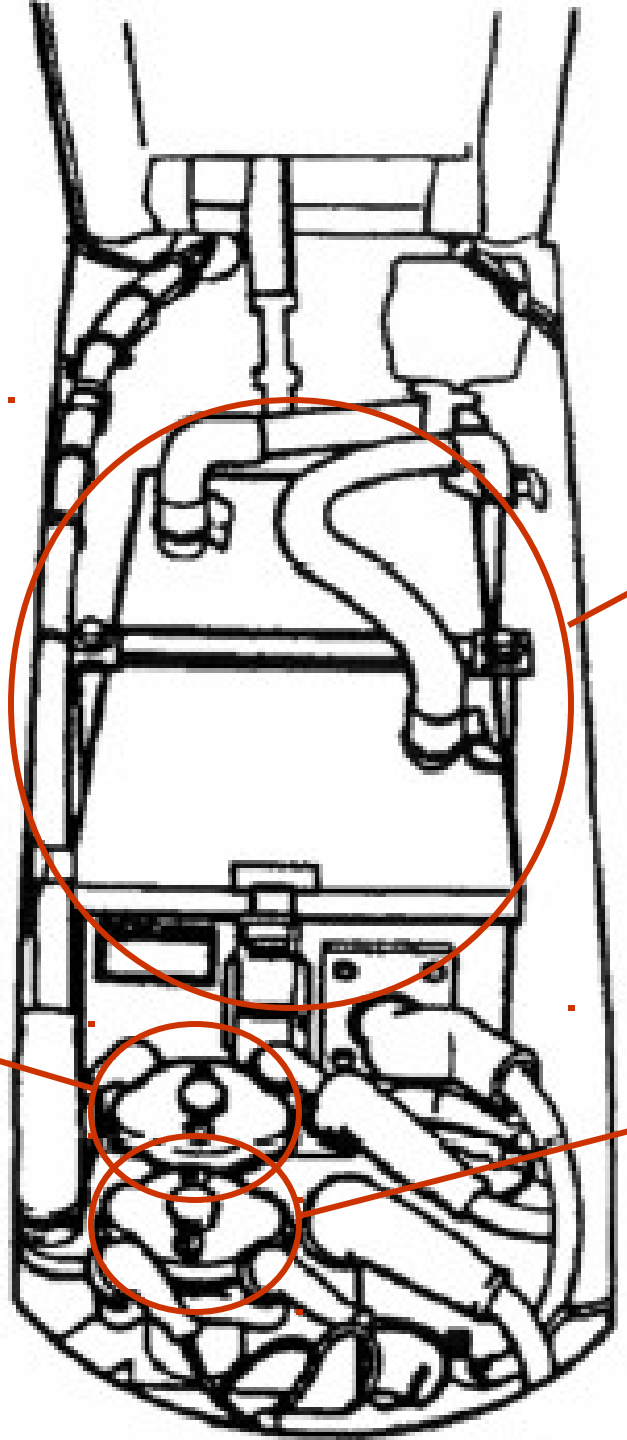
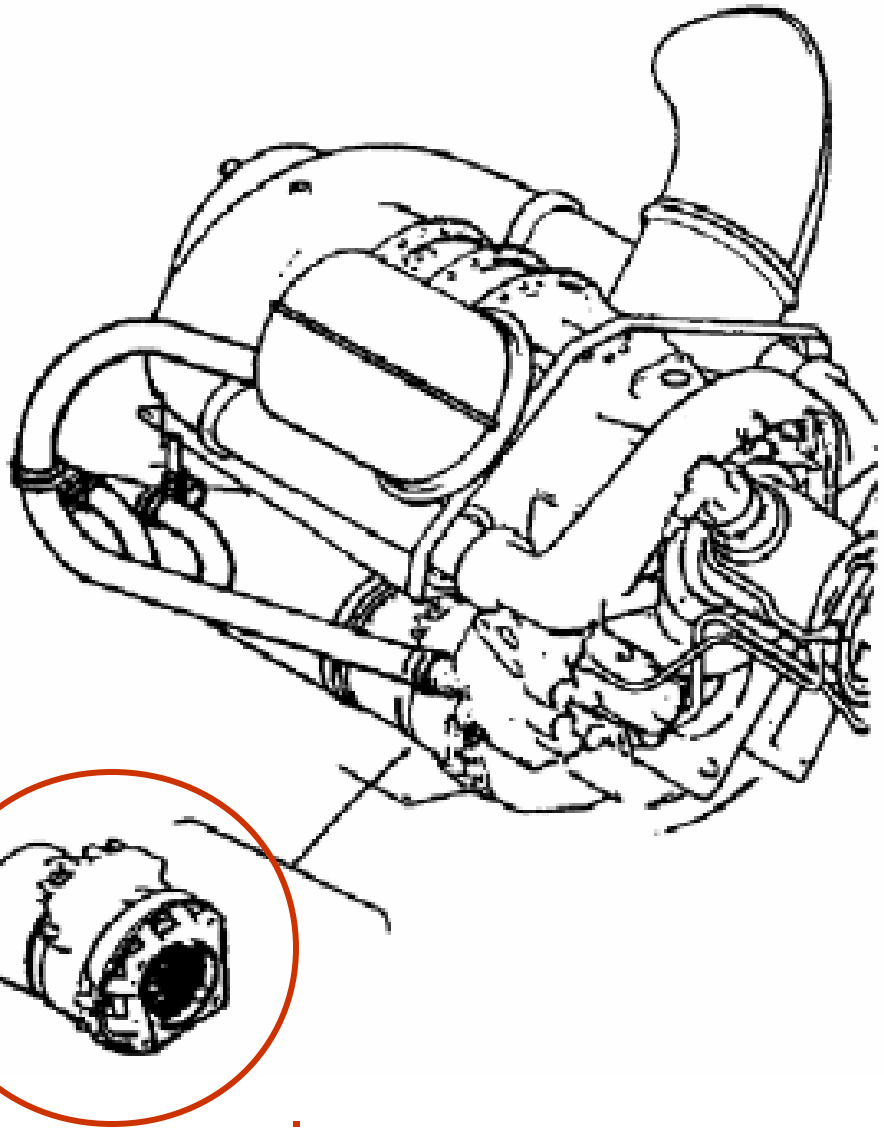
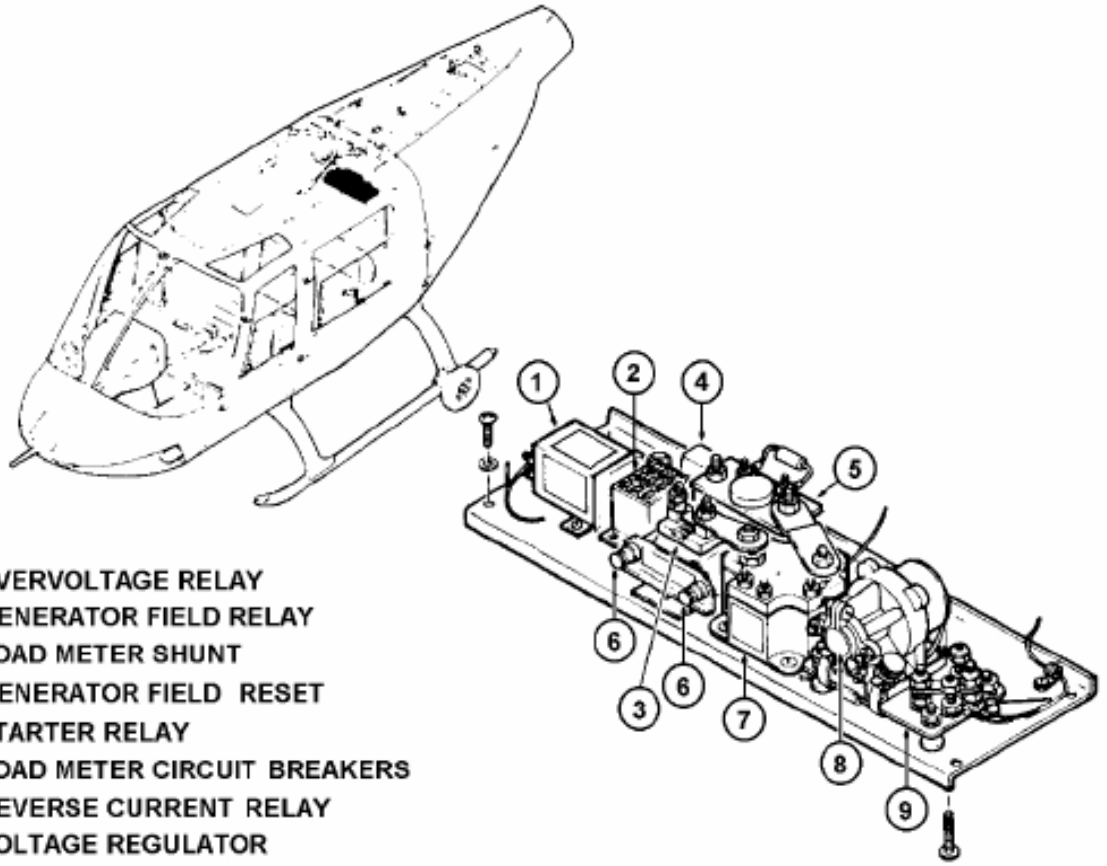
TH-57
Electrical System Review


Sealed Lead Acid Battery
Battery Relay
APU Relay

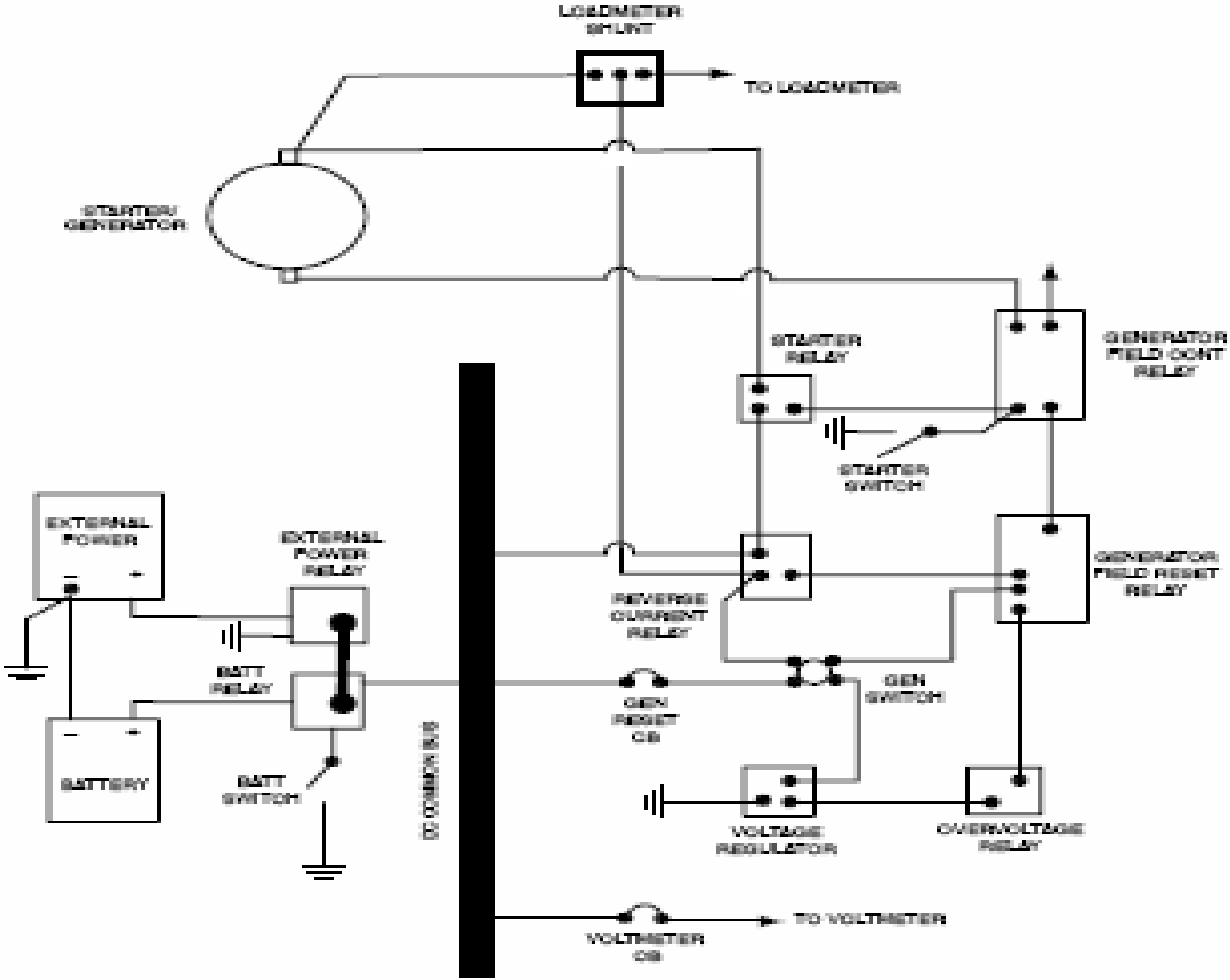
18
HELTRARON 18

HELLIONS
GET LUCKY


Starter /
Generator



1. OVERVOLTAGE RELAY
2. GENERATOR FIELD RELAY
3. LOAD METER SHUNT
4. GENERATOR FIELD RESET
5. STARTER RELAY
6. LOAD METER CIRCUIT BREAKERS
7. REVERSE CURRENT RELAY
8. VOLTAGE REGULATOR
9. BASE - VOLTAGE REGULATOR


LOADMETER SHUNT
TO LOADMETER
STARTER/ GENERATOR
STARTER RELAY
GENERATOR FIELD CONT RELAY
STARTER SWITCH
EXTERNAL POWER
EXTERNAL POWER RELAY
REVERSE CURRENT RELAY
GENERATOR FIELD RESET RELAY
BATT RELAY
GEN RESET CB
GEN SWITCH
BATTERY
BATT SWITCH
VOLTAGE REGULATOR
OVERVOLTAGE RELAY
TO VOLTMETER
VOLTMETER CB

Reverse Current Relay

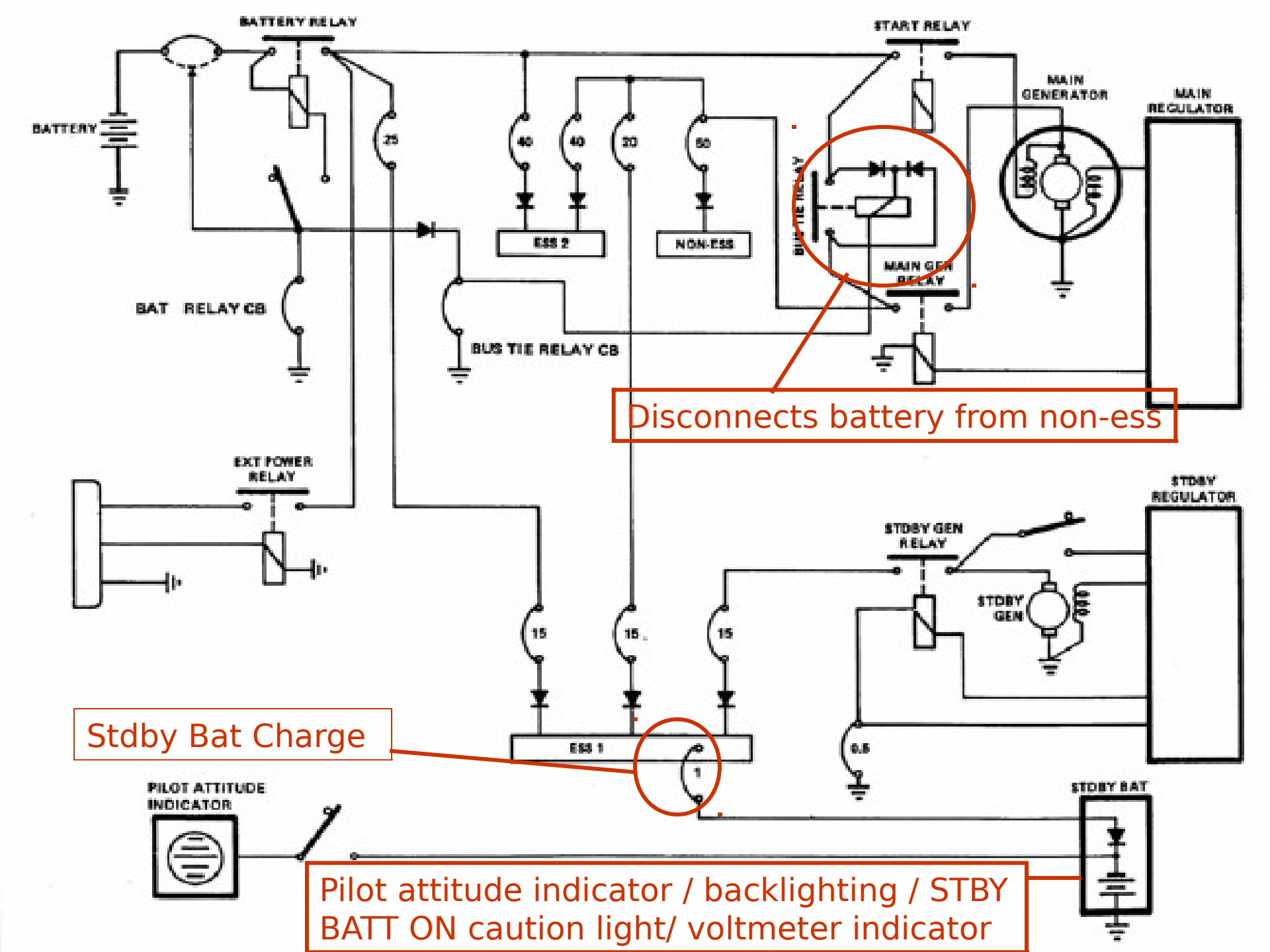
- **Connects generator to common BUS only when proper voltage is obtained.**
- **Prevents current flow from the battery to the generator.**
- **Disconnects the gen from the common BUS when voltage drops below a safe level.**

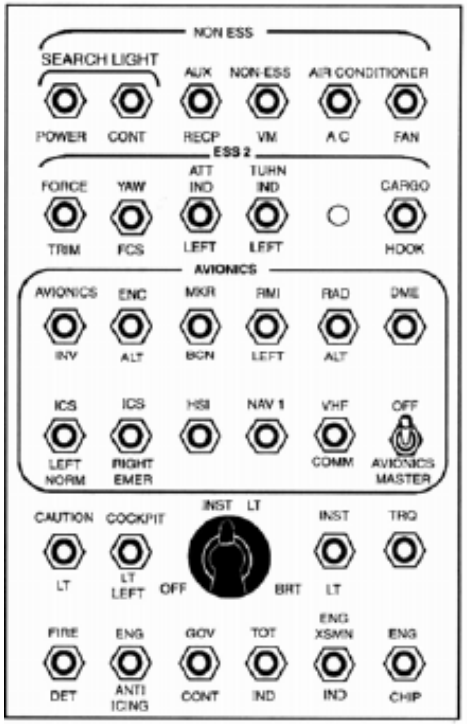
BACK

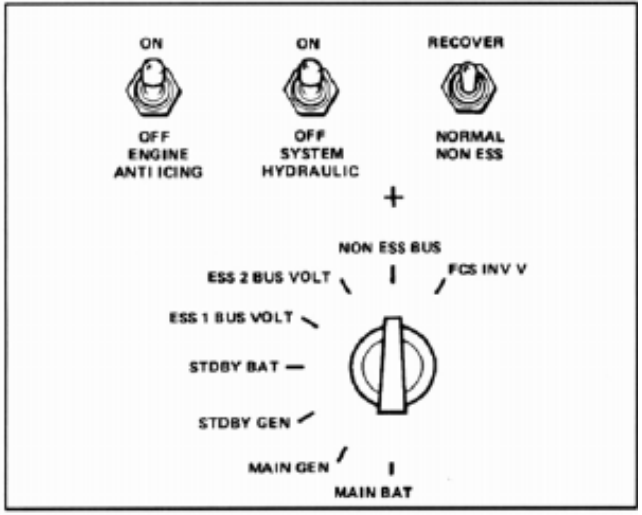
Overvoltage relay

Trips the generator reset relay, disconnecting the generator from the circuit, when line voltage reaches 31 volts.

BACK

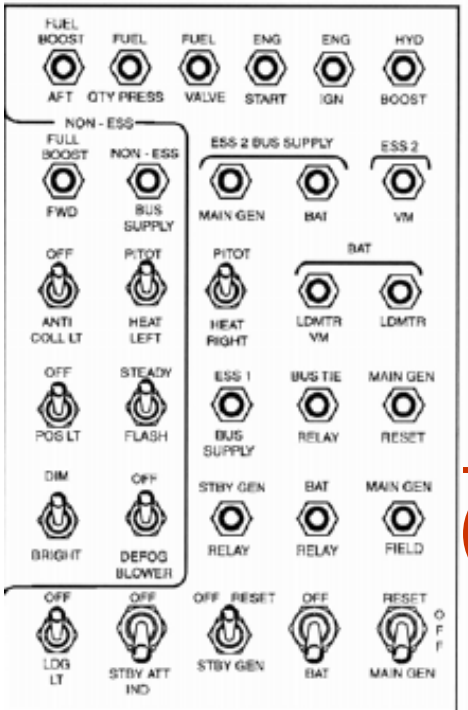

BATTERY RELAY
START RELAY
BATTERY
MAIN GENERATOR
MAIN REGULATOR
40
40
20
50
ESS 2
NON-ESS
BUS TIE RELAY
MAIN GEN RELAY
BAT RELAY CB
BUS TIE RELAY CB
Disconnects battery from non-ess
EXT POWER RELAY
STDBY REGULATOR
STDBY GEN RELAY
STDBY GEN
15
15
15
ESS 1
0.5
1
Stdby Bat Charge
PILOT ATTITUDE INDICATOR
STDBY BAT
Pilot attitude indicator / backlighting / STBY BATT ON caution light/ voltmeter indicator



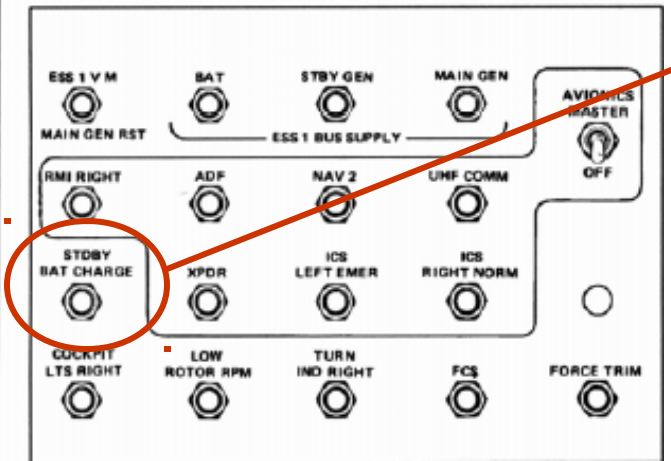


VOLTMETER PANEL

UPPER CIRCUIT BREAKER PANEL



LOWER CIRCUIT BREAKER PANEL



To check stdy bat voltage with other pwr source

Voltage Regulator

- Provides 28-volt regulation,
- Protects the system from over and undervoltage
- Prevents reverse current flow.

  (The voltage regulator controls the resistance of the gen. field to regulate the voltage output)

In the event of an over or undervoltage situation, the voltage regulator will deenergize the generator relay and the generator will be disconnected from the BUSES. The BUS tie relay will open, removing battery power from the nonessential BUS.

BACK

1. All switches — Off.
2. Twist grip — Check and closed (check full travel, no binding, idle detent).
3. All circuit breakers — In.

(C) 4. Voltmeter select switch — MAIN BAT.

5. BAT switch — ON. Check minimum 24 Vdc.

6. Torque and TOT gauges — Check the digital displays to ensure no limits have been exceeded.

(C) 7. STBY ATT IND switch — ON.

8. CAUTION lights — Check. The following caution lights will illuminate: HYDRAULIC PRESSURE, MAIN GEN FAILURE, ROTOR LOW RPM, TRANS OIL PRESS, and ENG OUT. Additionally, the TH-57C will have the STBY GEN FAIL light illuminated.

9. Fuel quantity gauge — Note fuel quantity.

10. AIRFRAME FUEL FILTER Button — Test. Check A/F FUEL FILTER caution light illuminated.

(C) 11. Voltmeter select switch — STBY BATT.
12. Battery switch — OFF after standby attitude indicator off flag disappears.

(C) 13. CHECK STBY BATT ON caution light is illuminated and STANDBY BATTERY voltage is a minimum of 20 Vdc.

Note

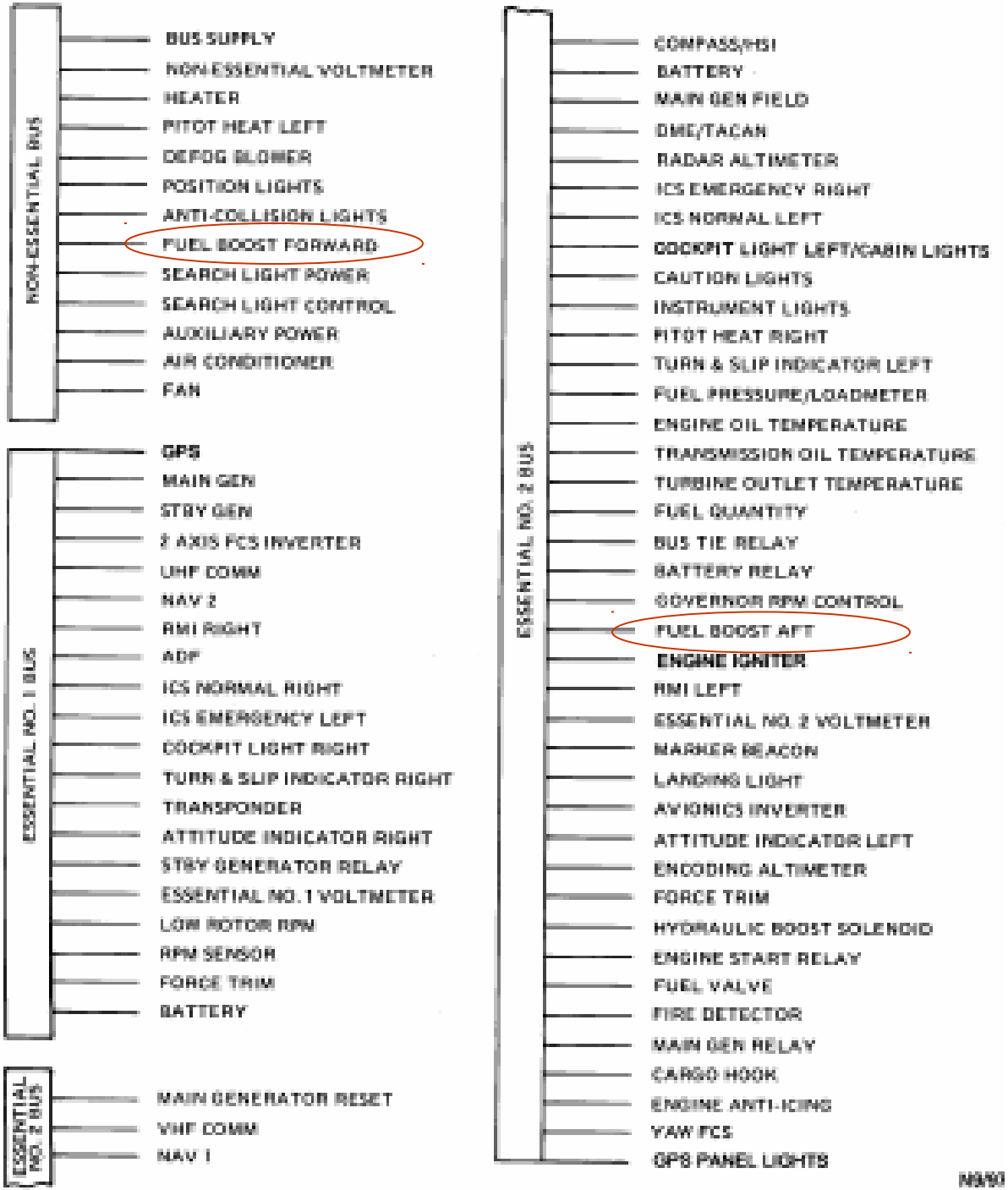
If STBY BAT voltage is less than 20 Vdc, aircraft is down for flight in IMC.

(C) 14. STBY ATT IND switch — OFF.

NON-ESS

ESS NO 1

ESS 2



ESS NO 2

BACK

[redacted]

BATTERY HOT	Battery case temperature is 60° ±8 °C or higher.	BAT — OFF. Land as soon as possible.
BATTERY TEMP	Battery case temperature is 54° ±8 °C or higher.	BAT — OFF. Flight may be continued.

CAUTION LIGHTS

BATTERY RLY (TH-57C)	Illumination during starting is normal. At other times with BAT switch — ON, continued illumination indicates fault in battery relay or protection circuits.	If BAT HOT light is not illuminated, continue flight in VMC and land as soon as practical. If BAT HOT light is illuminated, BAT — OFF. Land as soon as possible. **Note** Under certain conditions, total or partial electrical failure may follow illumination of the BATTERY RLY light.
FCS OFF (TH-57C)	Failure of AFCS fault protective circuits.	If light continues to illuminate, push STAB button off, pull FCS circuit breaker.
MAIN GEN or GEN FAILURE	Main generator has failed.	Refer to Generator Failure procedures.
STBY BATT ON (TH-57C)	Standby attitude indicator switch left ON after other power turned off.	Turn off standby attitude indicator prior to leaving helicopter to avoid depleting standby battery.
STBY GEN FAIL (TH-57C)	Standby generator failure.	Refer to STBY GEN FAIL (TH-57C) procedures.

14.16.2 Electrical Fire — Known Origin

14.16.1 Electrical Fire — Unknown Origin

Procedures:

(C)12. STBY GEN RELAY circuit breaker — In.

(C)13. STBY GEN switch — ON.

(C)14. STBY ATT IND switch — ON.

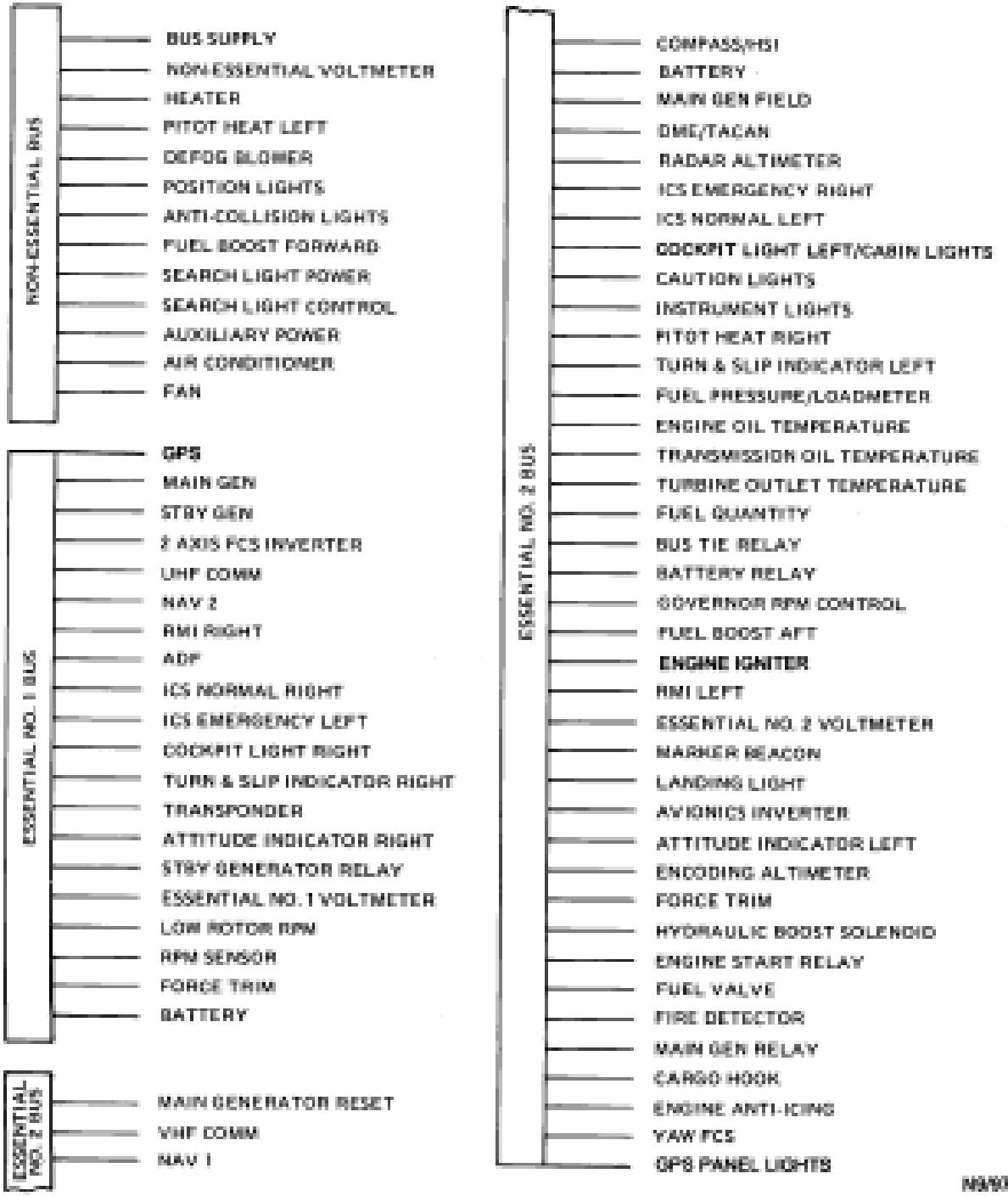
15. Circuit breakers for essential equipment — In one at a time in order of importance.

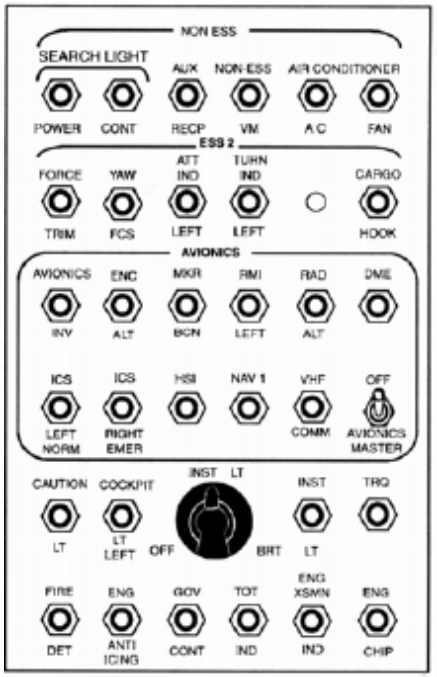
Note

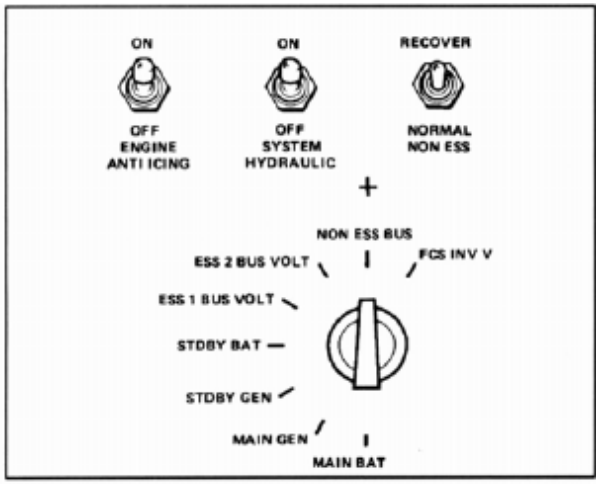
- Ensure corresponding bus supply circuit breakers are in to provide power to desired electrical equipment.
- Voltmeter will not indicate battery voltage until battery bus supply and voltmeter circuit breakers are in.
- Flight operation can be maintained without battery and generator. Instruments powered by the 28 Vdc power, however, will be inoperable.

What Would You Do

- Day VMC ?
- Night VMC ?
- IMC ?

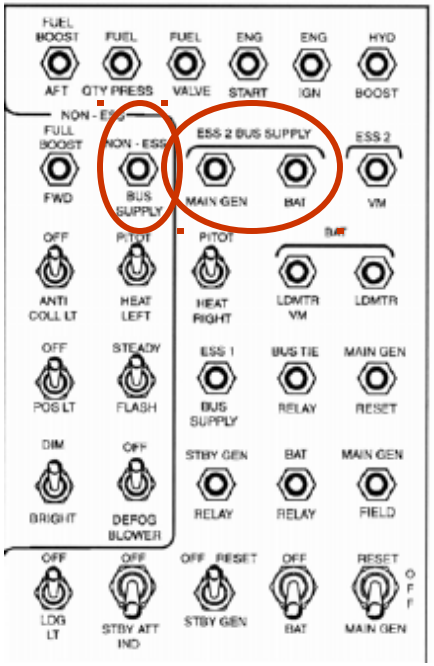




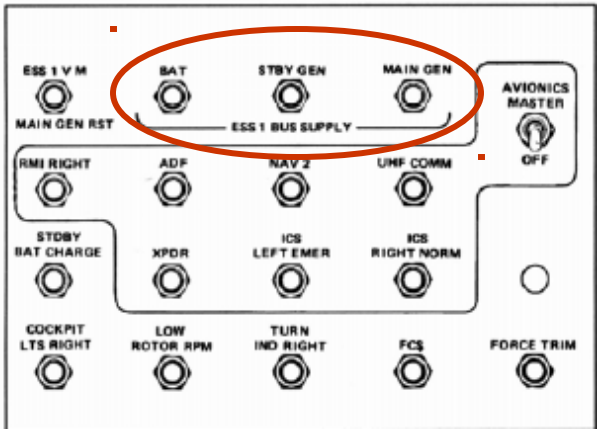


VOLTMETER PANEL

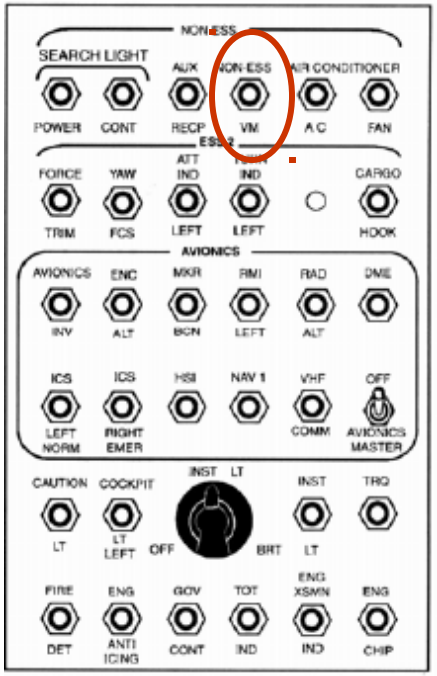
UPPER CIRCUIT BREAKER PANEL

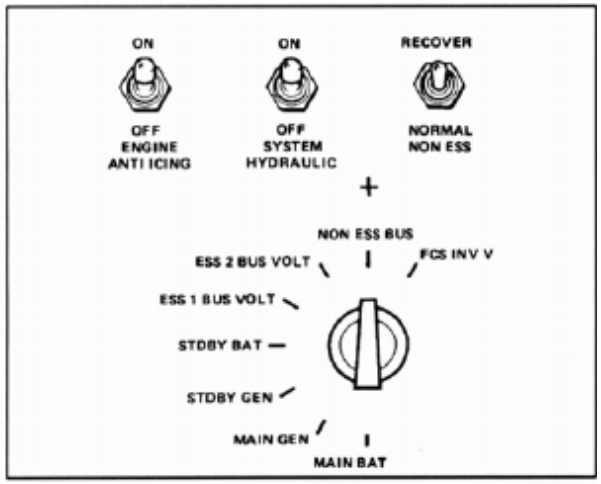


LOWER CIRCUIT BREAKER PANEL



BACK

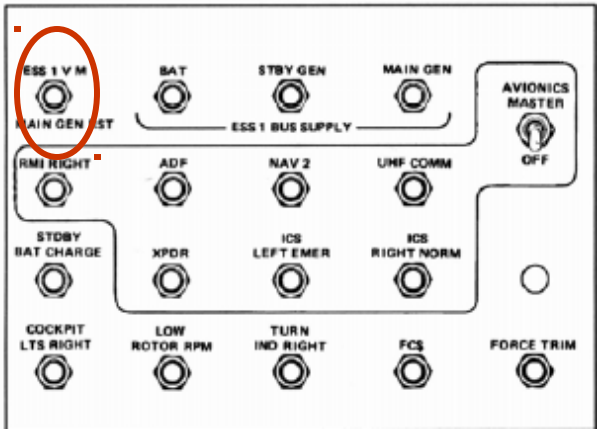




VOLTMETER PANEL

UPPER CIRCUIT BREAKER PANEL

LOWER CIRCUIT BREAKER PANEL



BACK

14.18 MAIN GENERATOR FAILURE

Indications:

Loadmeter to zero.

MAIN GEN or GEN FAIL caution light — On.

(B) Dc voltmeter indicates battery voltage.

(C) Voltmeter indicates 0.

WARNING

- With the battery switch OFF or battery exhaustion, both fuel boost pumps are inoperative. Descend below 6,000 feet pressure altitude.
- With one or both boost pumps inoperative, minimum fuel is 20 gallons; 10 gallons is considered unusable.

Note

- Prior to shutting off all electrical power, the pilot must determine the equipment that is essential to the particular flight environment that will be encountered (e.g., flight instruments and fuel boost pumps).

(C)
- In the TH-57C, time of operation of ESS No. 2 bus on battery power is approximately 40 minutes with pitot heat OFF and an 80 percent charged battery (approximately 35 minutes with pitot heat ON). To conserve battery power as needed for extended flights or for use of landing lights at destination, turn off unnecessary electrical equipment on the ESS No. 2 and NON ESS Bus.

(C)
- With the NORMAL/RECOVER switch in NORMAL, failure of the main generator will result in illumination of the FUEL PUMP caution light because of loss of power to the nonessential bus.

(C)
- Resetting the BUS/TIE RELAY circuit breaker will cause the main battery to power the nonessential bus, accelerating main battery depletion.

Procedures:

1. GEN FIELD and GEN RESET circuit breakers — Check in.

2. MAIN GEN switch — Reset, then ON.

If generator power is not restored:

3. MAIN GEN switch — OFF.

4. Unnecessary electrical equipment — OFF.

(C) 5. NORMAL/RECOVER switch — Recover as desired.

6. Descend below 6,000 feet.

7. Land as soon as practical.

If power is restored:

8. Continue flight.

(C)

Note

- In the TH-57C, with the loss of the main battery after a main generator failure, the HSI and both RMIs will be inoperative for TACAN, LOC, and VOR approaches; however, the RMIs will still provide relative ADF bearing. VMC should be attained as soon as possible.

- Be prepared for a possible electrical and/or engine compartment fire because of excessive wiring load or generator meltdown.

14.19 STANDBY GENERATOR FAILURE (C)

Indications:

STBY GEN FAIL caution light.

Procedures:

1. STBY GEN circuit breaker — In. Check voltmeter for indication.
2. STBY GEN switch — OFF, then ON.

If power not restored:

3. Land as soon as practical.

If power restored:

4. Continue flight.

14.20.1 FCS Inverter Failure (C)

Indications:

FCS light flashes.

Loss of pitch/roll servos.

Loss of FCS.

Note

FORCE TRIM will function.

Procedures:

If FCS inverter voltage is less than 111 volts:

1. FCS circuit breaker (E33-1, lower panel) — Pull.
2. Establish VMC.

14.20.2 Avionics Inverter Failure (C)

Indications:

Ac voltage drop.

RMI — Needles failing in the VOR position.

Yaw servo failure.

Procedures:

1. AVIONICS INV circuit breaker (ESS-2, upper avionics panel) — Pull.

Note

Further flight in IMC is possible, but must be accomplished without RMIs and yaw servo.

14.21 DC LOADMETER AND VOLTMETER

If the loadmeter or voltmeter fluctuates erratically, pegs, or goes to zero:

1. Generator — Cycle.

If the problem is corrected:

2. Continue the flight.

If the problem is not corrected:

3. Use Generator Failure procedures.

CAUTION

Sustained loadmeter indications greater than 70 percent may be caused by an electrical fire.